PB-217 165

HANDBOOK ON SANITATION OF RAILROAD PASSENGER CARS. STANDARDS OF SANITATION APPLICABLE TO THE CONSTRUCTION, OPERATION AND MAINTENANCE OF RAILROAD PASSENGER AND DINING CARS

Public Health Service
Washington, D. C.

1964

DISTRIBUTED BY:

NTIS

National Technical Information Service
U. S. DEPARTMENT OF COMMERCE
5285 Port Royal Road, Springfield Va. 22151

PB 217 165

HANDBOOK ON SANITATION OF

Railroad Passenger Cars

1964 REVISION

Reproduced by
NATIONAL TECHNICAL
INFORMATION SERVICE
U S Department of Commerce
Springfield VA 22151

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service

HANDBOOK ON SANITATION OF

Railroad Passenger Cars

1964 REVISION

STANDARDS OF SANITATION APPLICABLE
TO THE CONSTRUCTION, OPERATION AND MAINTENANCE
OF RAILROAD PASSENGER AND DINING CARS

U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Public Health Service
Division of Environmental Engineering and Food Protection
Washington, D.C. 20201

Related Publication:

Railroad Servicing Areas
(PHS Pub. No. 66)

Public Health Service Publication No. 95

1964 Revision

UNITED STATES GOVERNMENT PRINTING OFFICE, WASHINGTON : 1964

CONTENTS

	Page
FOREWORD	v
Part I. GENERAL STANDARDS	1
Water Supply Facilities	1
Toilet and Lavatory Facilities	4
Ventilating and Heating	4
Part II. COACHES	4
Part III. SLEEPING CARS	5
Linen Lockers	5
Drinking Water Facilities	5
Part IV. DORMITORY CARS	5
Linen Lockers	5
Crew's Clothing Locker	5
Ventilation	5
Part V. LOUNGE, CLUB, AND PARLOR CARS	5
Part VI. CONSTRUCTION AND OPERATION OF DINING CARS	5
Section A. Definitions	6
Section B. Food	7
Section C. Personnel	8
Section D. Food Equipment and Utensils	9
Section E. Sanitary Facilities and Controls	15
Section F. Other Facilities and Operations	16

FOREWORD

Because food may be harmful to the consumer if it is not clean, wholesome, free of spoilage, and properly prepared, sanitation in railroad dining cars, as in other eating places, is of considerable public health importance. Numerous outbreaks of disease traceable to food occur annually. Many of these outbreaks could have been prevented if recognized principles of sanitation had been observed. This handbook is designed, therefore, to serve as a guide to those persons who must apply these principles to dining car construction, operation, and maintenance.

This publication was prepared by the Interstate Carrier Branch, of the Division of Environmental Engineering and Food Protection, Public Health Service, and is one of a set of two handbooks on the subject of railroad sanitation. The other, entitled "Railroad Servicing Areas," prescribes certain sanitation features which may be incorporated into the design, construction, and operation of facilities used for servicing railroad passenger cars.

It should be understood at the outset that the standards appearing on the following pages, although not having the legal force of the Interstate Quarantine Regulations, were written with a view of conforming to the intent of those regulations. Compliance with the standards, therefore, will insure compliance with the Interstate Quarantine Regulations and amendments. In the event of noncompliance with a standard, however, and failure to correct the reported condition, final corrective action will be based upon the applicability of the regulation concerned. Amendments to the Interstate Quarantine Regulations were considered in the preparation of this handbook.

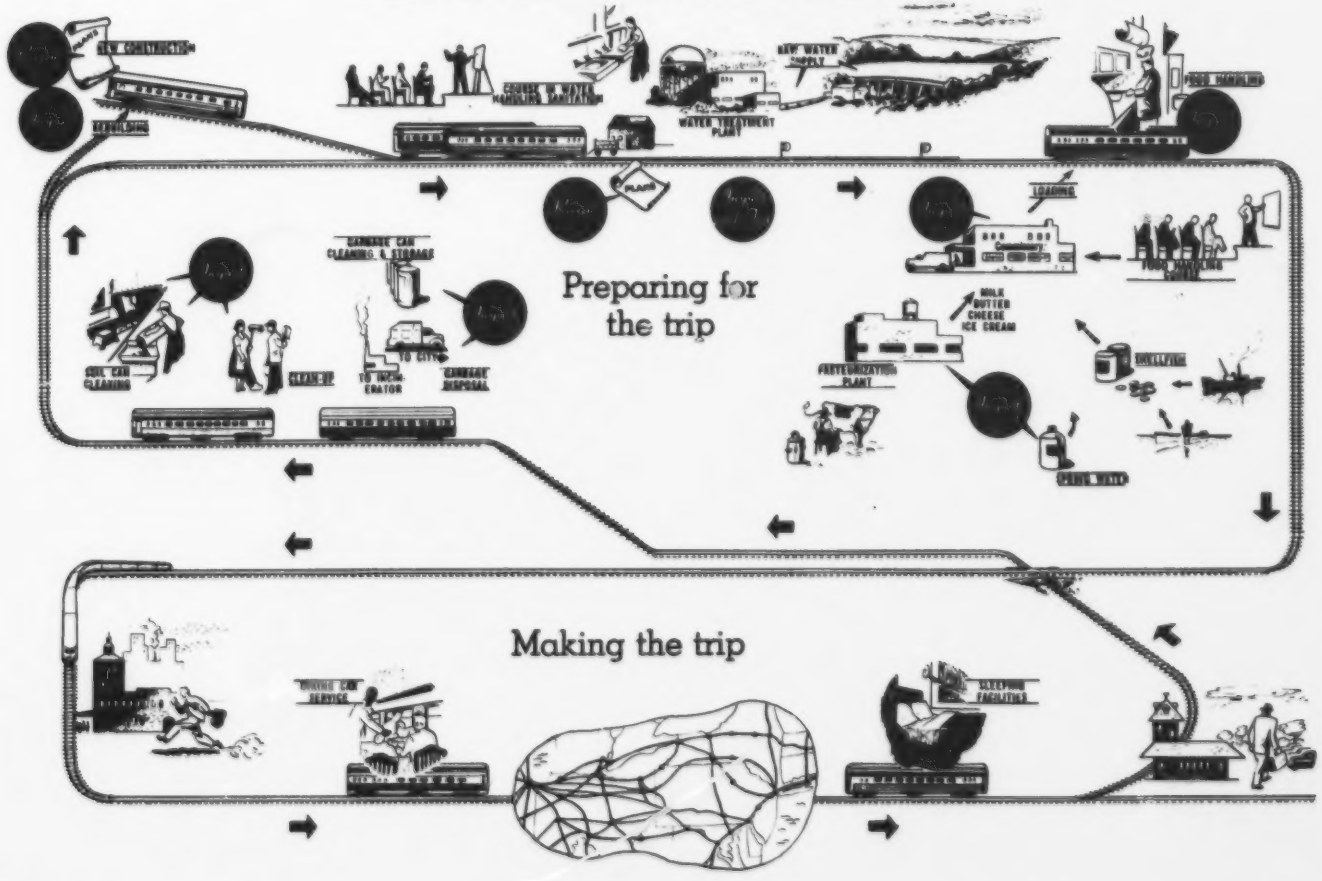
This handbook combines and revises the material formerly presented in two handbooks, "Railroad Passenger Car Construction" and "Dining Cars in Operation," and supersedes them.

The Association of American Railroads, and the Association of American Railroad Dining Car Officers have been extremely helpful in reviewing the preliminary draft of this handbook. Their suggestions have made it possible to produce a more practical handbook than might otherwise have been possible.

Improved methods and equipment, undoubtedly, will be developed from time to time and will require changes in the application of existing standards. These developments will be noted and, as circumstances require, supplements to or revisions of this handbook will be issued.

Preceding page blank

RAILROAD SANITATION



Part I. GENERAL STANDARDS APPLYING TO ALL TYPES OF RAILROAD PASSENGER CARS

1. WATER SUPPLY FACILITIES. *a.* All water distribution pipes and tubing should be of an impervious, nontoxic material. Ferrous pipe and fittings should be galvanized to prevent rusting. Plastic pipe and fittings must meet the requirements of the Public Health Service.

b. The water system, whether pressure or gravity type, should be closed from the car-filling connection to the discharge taps, except that vent openings will be permitted if they are constructed and located in such a manner as to prevent the entrance of contamination.

c. Car-filling connections through which potable water tanks are filled should be provided on both sides of each car for each type of water system. Such connections should be so located and protected as to minimize the hazard of their contamination by toilet hopper discharges, roadbed dust and dirt, etc.

(1) The car-filling connection should be constructed so as to permit a direct and tight connection with the water hose nozzle. Only one type of water-filling connection should be provided on any one car; except that on cars which carry both gravity and pressure water systems, one type of connection for each type of system may be provided if such connections are provided on both sides of the car.

(2) If a male-type, car-filling connection is used, it should be completely enclosed in a metal receptable with a spring-loaded or self-closing cover for protection against contamination. The receptacle should be so constructed that pooling of water within the receptacle cannot take place.

(3) If a female-type, car-filling connection is used, it should have an overlapping spring-loaded or self-closing cover on the end, or should be otherwise enclosed for protection against contamination.

d. All plumbing fixtures should be installed so that they, and the immediate areas around them, can be easily cleaned. All piping to plumbing fixtures should be either enclosed or located above the floor at a distance which permits thorough cleaning.

e. Water storage tanks should be designed so they can be sterilized and flushed, and they should be equipped with a drain which permits complete drainage of the tank.

f. Strainers, if provided, should be of the removable, perforated-metal type and should be easily accessible.

g. Since water must be safe in quality and handled in a sanitary manner before it can be considered acceptable for use, filters are not necessary. A hazard to an otherwise safe supply of water on the car might be introduced if the units are contaminated during servicing. If filters are provided, they should be of the removable type and should be (1) constructed so they can be cleaned and sterilized, or (2) constructed so they can be replaced with sterilized units.

h. Water coolers should be an integral part of the water system. The water compartment should consist of an enlarged pipe, coil, pan, or tank. The cooler should be of durable, rust-resistant material, and so constructed as to prevent the refrigerant from coming into contact with the potable water. If ice is to be used as the refrigerant, the ice compartment should be reinforced and should be provided with a separate drain. Water coolers in which the ice is in direct contact with the drinking water are entirely unsatisfactory. Dispensers for single-service drinking cups and receptacles for the used cups should be installed adjacent to the water coolers, unless the coolers are equipped with fountains or the water is used only for table or counter service. Removable water coolers are acceptable only on existing cars where there is no other water system on the car; e.g., cars on some commuting trains. Inverted bottle water coolers or dispensers which utilize fixed dispensing devices are not acceptable.

i. All parts of car water systems, including tanks and the distribution system, should be sterilized with chlorine or steam before cars are placed in operation. If chlorine is used in the sterilization of the potable water system, the following instructions should be utilized:

(1) Flush the tank and distribution system with potable water.

(2) Determine the volume of water necessary to fill the tanks and distribution system completely. The amount of disinfecting agent required may be determined from the following table. When the capacity of the system or the concentration of chlorine in the compound is different from those listed in the table, the amount of disinfecting agent for a 50-p.p.m. solution can be computed by—

$$\text{Ounces of chlorine compound} = \frac{\text{Capacity of water system in gallons}}{1.5 \times \text{percent chlorine in compound}}$$

TABLE I.—*Amount of chlorine compound required for a 50-p.p.m. solution*

Capacity of system		Ounces of chlorine compound			
Gallons	Pounds	Chlorinated Lime (25 percent)	High-test calcium hypochlorite (70 percent)	Liquid sodium hypochlorite	
				(5 percent)	(10 percent)
50	417	1.3	0.5	6.7	3.3
75	626	2.0	0.7	10.0	5.0
100	834	2.7	1.0	13.3	6.7
125	1,043	3.3	1.2	16.7	8.3
150	1,251	4.0	1.4	20.0	10.0
175	1,460	4.7	1.7	23.3	11.7
200	1,668	5.3	1.9	26.7	13.3
250	2 085	6.7	2.4	33.3	16.7

Note.—A heaping tablespoon holds approximately ½ ounce; a measuring cup approximately 6 ounces of the dry chemical.

(3) Prepare the chlorine solution as follows:

(*a*) *Chlorinated lime:* Place the proper amount of chlorine compound in a clean, dry bucket. Add a small amount of water and mix to a thick paste. Dilute the paste by adding water gradually and stirring constantly until the chemical goes into solution. (Warm water is better than cold water for this purpose.) Allow the solution to stand for 30 minutes, so that the undissolved particles may settle to the bottom. Pour off the clear liquid (which is the chlorine solution) and, if necessary, filter it through muslin or cheesecloth.

(*b*) *High-test hypochlorite:* Place the proper amount in a bucket, fill with water, and stir until the powder is dissolved (disregard slight turbidity, if any).

(*c*) *Liquid sodium hypochlorite:* These solutions require no additional preparation.

(4) Introduce the chlorine solution into the potable-water tank.

(5) Immediately after introducing the chlorine solution, the tank should be completely filled with water. Sufficient mixing usually will be obtained by swirling action of the incoming water.

(6) Open each tap on the distribution system and allow the water to flow until chlorinated water appears. Since a certain amount of the chlorinated water will have been drawn from the storage tank, it should be refilled to overflowing and chlorine solution should be added, if necessary, to obtain at least a 50-p.p.m. dose in the tank.

(7) After the tank and the piping system have been filled, the chlorinated water should be allowed to stand in them for at least 4 hours before it is discharged. (In an emergency, the contact time may be shortened to 1 hour by increasing the dosage to 100-p.p.m.)

(8) After this contact period, the tank and distribution system should be drained and then flushed with potable water until the chlorine taste is not objectionable.

2. TOILET AND LAVATORY FACILITIES. *a.* Toilet hoppers should be designed to prevent accumulation of fecal matter on the sides of the bowl. Water-flushed toilet hopper valves should be constructed to deliver an ample volume of water at a rate which will thoroughly flush the fixture at each operation. In pressure- or gravity-type water systems, a backflow preventer (vacuum breaker) should be provided for each hopper; however, when the water system is gravity type and the air inlet to the vent is located higher than every water discharge outlet of the system, the vacuum breaker may be omitted. The backflow preventer should be located on the discharge side of the hopper valve, with the bottom of the backflow preventer at least 4 inches above the flood level or overflow rim of the hopper. Toilets of the dryhopper type are acceptable only on cars, such as commuting cars, which have no water systems. A toilet-paper holder should be installed next to each toilet hopper. Doors to toilet rooms should be provided with locks if no other provisions are made to prevent hoppers from being discharged on the ground surfaces in restricted areas.

b. Lavatory facilities (washbasins) should be permanent installations of durable and easily cleanable construction. Folding washbasins are acceptable. Water inlets to each basin should terminate at least 1 inch, or twice the diameter of the inlet, whichever is greater, above the flood level or overflow rim of the basin; otherwise, a properly installed backflow preventer (vacuum breaker) should be provided. A holder or dispenser for soap, and a clean towel receptacle, should be located next to all lavatories or washbasins. A soiled towel receptacle should be provided also, unless another receptacle suitable to receive soiled towels is convenient to the facility.

c. Dental bowls, where provided, should be equipped with backflow preventers (vacuum breakers) unless all water inlets to the bowls terminate at least 1 inch, or twice the diameter of the inlet, whichever is greater, above the overflow rim of the fixture.

d. A nonporous material, such as rubber tile, asphalt tile, or linoleum, should be used for the floors of toilet and lavatory rooms. Joints between the floors and side walls should be coved.

3. VENTILATING AND HEATING. All cars should be constructed so they can be provided with an adequate supply of fresh or conditioned air at all times and with adequate heat in cold weather.

Part II. COACHES

The general standards listed in part I apply to the construction of all coaches.

Part III. SLEEPING CARS

The general standards listed in part I apply to the construction of all sleeping cars. The following additional standards will apply also:

1. LINEN LOCKERS. Separate storage spaces, equipped with a door or doors, should be provided for storage of clean linens and soiled linens.

2. DRINKING WATER FACILITIES. Circulating refrigerated water systems are considered more desirable than carafes for supplying drinking water to occupants of bedrooms, drawing rooms, compartments, roomettes, etc. When used for serving drinking water, carafes should be provided with a closure, a top, or a cover which protects the pouring lip from contamination, or should be stored in separate cabinets provided for this purpose. In cars equipped with a circulating ice water system, carafes for emergency use should be stored in a clean, protected space.

Part IV. DORMITORY CARS OR DORMITORY PORTIONS OF COMBINATION CARS

The general standards outlined in part I apply to the construction of all dormitory cars or the dormitory portions of combination cars. The following additional standards also will apply:

1. LINEN LOCKERS. If linen is stored on dormitory cars, separate storage spaces, equipped with a door or doors, should be provided for storage of clean linens and soiled linens.

2. CREW'S CLOTHING LOCKER. If storage lockers for the crew's clothing are provided, they should be properly ventilated.

3. VENTILATION. Special attention should be given to proper ventilation of dormitory spaces.

Part V. LOUNGE, CLUB, AND PARLOR CARS

The general standards listed in part I apply to the construction of all lounge, club, and parlor cars.

The standards listed in part VI apply to the construction of the food or drink handling areas of all lounge, club, and parlor cars.

Part VI. CONSTRUCTION AND OPERATION OF DINING CARS

The general standards listed in part I apply to the construction of all dining cars. In addition, those standards listed in sections A through F below also apply.

The standards enumerated below apply to all dining cars and the areas in all other cars where food and/or drink are prepared, stored, or served.

Section A. DEFINITIONS

The following definitions shall apply in the interpretation of the standards appearing in this handbook:

1. **ADULTERATED** shall mean the condition of a food (*a*) if it bears or contains any poisonous or deleterious substance in a quantity which may render it injurious to health; (*b*) if it bears or contains any added poisonous or deleterious substance for which no safe tolerance has been established by regulation, or in excess of such tolerance if one has been established; (*c*) if it consists in whole or in part of any filthy, putrid, or decomposed substance, or if it is otherwise unfit for human consumption; (*d*) if it has been processed, prepared, packed, or held under insanitary conditions, whereby it may have become contaminated with filth, or whereby it may have been rendered injurious to health; (*e*) if it is in whole or in part the product of a diseased animal, or an animal which has died otherwise than by slaughter; or (*f*) if its container is composed in whole or in part of any poisonous or deleterious substance which may render the contents injurious to health.
2. **APPROVED** shall mean acceptable to the Public Health Service based on its determination as to conformance with appropriate standards and good public health practice.
3. **CLOSED** shall mean fitted together snugly leaving no openings large enough to permit the entrance of vermin.
4. **CORROSION-RESISTANT MATERIAL** shall mean a material which maintains its original surface characteristics under prolonged influence of the food, cleaning compounds, and sanitizing solutions which may contact it.
5. **DINING CAR** shall mean any railroad passenger car on which food or drink is regularly prepared, stored, or served.
6. **EASILY CLEANABLE** shall mean readily accessible and of such material and finish, and so fabricated that residue may be completely removed by normal cleaning methods.
7. **EMPLOYEE** shall mean any person working in a dining car who transports food or food containers, who engages in food preparation or service, or who comes in contact with any food utensils or equipment.
8. **EQUIPMENT** shall mean all stoves, ranges, hoods, meatblocks, tables, counters, refrigerators, sinks, dishwashing machines, steamtables, and similar items, other than utensils, used in the operation of a dining car.
9. **FOOD** shall mean any raw, cooked, or processed edible substance, beverage, or ingredient used or intended for use or for sale in whole or in part for human consumption.

10. FOOD-CONTACT SURFACES shall mean those surfaces of equipment and utensils with which food normally comes in contact, and those surfaces with which food may come in contact and drain back onto surfaces normally in contact with food.

11. KITCHENWARE shall mean all multiuse utensils other than tableware used in the storage, preparation, conveying, or serving of food.

12. PERISHABLE FOOD shall mean any food of such type or in such condition as may spoil.

13. POTENTIALLY HAZARDOUS FOOD shall mean any perishable food which consists in whole or in part of milk or milk products, eggs, meat, poultry, fish, shellfish, or other ingredients capable of supporting rapid and progressive growth of infectious or toxigenic micro-organisms.

14. SAFE TEMPERATURES, as applied to potentially hazardous food, shall means temperatures of 45° F. or below, and 140° F. or above.

15. SANITIZE shall mean effective bactericidal treatment of clean surfaces of equipment and utensils by a process which has been approved by the Public Health Service as being effective in destroying micro-organisms, including pathogens.

16. SEALED shall mean free of cracks or other openings which permit the entry or passage of moisture.

17. SINGLE-SERVICE ARTICLES shall mean cups, containers, lids, or closures; plates, knives, forks, spoons, stirrers, paddles; straws, place mats, napkins, doilies wrapping material; and all similar articles which are constructed wholly or in part from paper, paperboard, molded pulp, foil, wood, plastic, synthetic, or other readily destructible materials and which are intended by the manufacturers and generally recognized by the public as for one usage only, then to be discarded.

18. TABLEWARE shall mean all multiuse eating and drinking utensils, including flatware (knives, forks, and spoons).

19. UTENSIL shall mean any tableware and kitchenware used in the storage, preparation, conveying, or serving of food.

20. WHOLESOME shall mean in sound condition, clean, free from adulteration, and otherwise suitable for use as human food.

Section B. FOOD

1. FOOD SUPPLIES. All food shall be from sources approved or considered satisfactory by the Public Health Service, and shall be clean, wholesome, free from spoilage, free from adulteration and misbranding, and safe for human consumption. No hermetically sealed, nonacid and low-acid food which has been processed in a place other than a commercial food-processing establishment shall be used.

2. FOOD PROTECTION. All food while being stored, prepared, displayed, served, transported, or sold, shall be protected from contamination. Whole-

some food, if mishandled, can become contaminated from a number of sources. Food-protection measures are designed to eliminate the contamination of food from any source within the establishment, and to prevent the growth of disease-producing organisms, and the production of bacterial toxins, in the event that pathogens are present in the food. All perishable food shall be stored at such temperatures as will protect against spoilage. All potentially hazardous food shall be maintained at safe temperatures (45° F. or below, or 140° F. or above), except during necessary periods of preparation and service. Raw fruits and vegetables shall be washed before use. Stuffing, poultry, stuffed meats and poultry shall be heated, throughout, to a minimum temperature of 165° F., with no interruption of the initial cooking process. Pork and pork products shall be thoroughly cooked to heat all parts of the meat to at least 150° F. before being served. Individual portions of food once served to the customer shall not be served again; provided, that wrapped food which has not been unwrapped, which is not potentially hazardous food and which is wholesome may be reserved.

Frozen food shall be kept at such temperatures as to remain frozen, except when being thawed for preparation or use. Potentially hazardous frozen food should be thawed at refrigerator temperatures of 45° F. or below; or under cool, potable running water (70° F. or below); or quick-thawed as part of the cooking process; or by any other method satisfactory to the Public Health Service.

Containers of food shall be stored in such a manner as to be protected from splash and other contamination.

Wet storage of packaged food shall be prohibited. The storage of properly packaged food in properly drained, crushed, cubed, or flaked ice will not be considered "wet" storage.

Only such poisonous and toxic materials as are required to maintain sanitary conditions and for sanitization purposes may be used in dining cars. Poisonous polishing materials shall not be used on equipment or utensils, not stored in the dining car. Poisonous compounds, such as insecticides and rodenticides, in powdered form, shall have a distinctive color and identified so as not to be mistaken for food.

Section C. PERSONNEL

1. HEALTH AND DISEASE CONTROL. No person while affected with any disease in a communicable form, or while a carrier of such disease, or while afflicted with boils, infected wounds, sores, or an acute respiratory infection, shall work in any area of a dining car in any capacity in which there is a likelihood of such person contaminating food or food-contact surfaces with pathogenic organisms, or transmitting disease to other individuals; and

no person known or suspected of being affected with any such disease or condition shall be employed in such an area or capacity.

2. CLEANLINESS. All employees shall wear clean outer garments used only for dining car duty, maintain a high degree of personal cleanliness, and conform to hygienic practices while on duty. They shall wash their hands thoroughly in an approved hand-washing facility before starting work, and as often as may be necessary to remove soil and contamination. No employee shall resume work after visiting the toilet room without first washing his hands. Employees shall not use tobacco in any form while engaged in food preparation or service, or while in equipment and utensil washing or food-preparation areas.

Section D. FOOD EQUIPMENT AND UTENSILS

1. SANITARY DESIGN, CONSTRUCTION AND INSTALLATION OF EQUIPMENT AND UTENSILS. All equipment and utensils shall be so designed and of such material and workmanship as to be smooth, easily cleanable and durable, and shall be in good repair; and the food-contact surfaces of such equipment and utensils shall, in addition, be easily accessible for cleaning, nontoxic, corrosion resistant and relatively nonabsorbent: Provided, that, when approved by the Public Health Service, exceptions may be made to the above materials requirements for equipment such as cutting boards, blocks, and bakers' tables.

All equipment shall be so installed and maintained as to facilitate the cleaning thereof, and of all adjacent areas.

Equipment in use at the time of adoption of these standards which does not meet fully the requirements, may be continued in use if it is in good repair, capable of being maintained in a sanitary condition and the food-contact surfaces are nontoxic.

Single-service articles shall be made from nontoxic materials.

Utensils containing or plated with cadmium, antimony, zinc, lead, or other material toxic under use conditions shall not be used. Solder, when used as a food-contact surface, shall be limited to joining metal or sealing seams between abutting metal surfaces; shall be of such formulation as to be nontoxic under use conditions; shall contain no more lead than is necessary under good manufacturing practice; and shall, consistent with good industrial practice in the refining of its constituent elements, be free of cadmium, antimony, bismuth, and other toxic materials.

Joints and seams in equipment and between various units of equipment should be smooth, easily cleanable, and without cracks or crevices. Unnecessary ledges should be eliminated. All internal corners in equipment should be rounded with a minimum radius of one-fourth inch, and edges should be finished smooth. Gaskets should be of nonabsorbent material, and kept in good repair.

All compartments with lids should be designed with a collar or breaker strip which will prevent seepage into the compartment. Recessed or flush-type handles, if used on lids, should be constructed so as to be easily cleaned, and to prevent pooling of liquids within the recess.

Water-glass filling devices should be so constructed and located as to prevent contamination of adjacent areas by water which has overflowed the glass and spilled over the hands of employees, or splashed from the drain tray. A drain from the unit should be provided.

The minimum clearance between the floor and the undersurface of new or reconstructed equipment should be at least 6 inches, unless these spaces are completely enclosed. Toe space under the front surface of equipment is satisfactory.

All equipment having sanitation significance, used or intended for use by a carrier or its caterer, unless shown on the "List of Accepted Equipment for Interstate Carrier Use," should be reviewed for acceptance by the Public Health Service.

2. CLEANLINESS OF EQUIPMENT AND UTENSILS. All eating and drinking utensils shall be thoroughly cleaned and sanitized after each usage.

All kitchenware and food-contact surfaces of equipment, exclusive of cooking surfaces of equipment, used in the preparation or serving of food or drink, and all food-storage utensils, shall be thoroughly cleaned immediately after each food-service period. Cooking surfaces of equipment shall be cleaned at least once a day. All utensils and food-contact surfaces of equipment used in the preparation, service, display, or storage of potentially hazardous food shall be thoroughly cleaned and sanitized prior to such use. Nonfood-contact surfaces of equipment shall be cleaned at such intervals as to keep them in a clean and sanitary condition.

After cleaning and until use, all food-contact surfaces of equipment and utensils shall be so stored and handled as to be protected from contamination.

All single-service articles shall be stored, handled, and dispensed in a sanitary manner, and shall be used only once.

If used, can openers should be cleaned after each meal.

Cloths used by employees and all tablecloths and napkins should be clean. Used napkins should not be used as dishcloths. Because they tend to become soiled quickly, cutting boards, meatblocks, etc., with which food often comes in contact, should be given special attention in cleaning operations.

3. SANITIZATION OF EQUIPMENT AND UTENSILS. Both kitchen and pantry of food or beverage service cars should be equipped with a three-compartment sink where manual dishwashing (cleaning, rinsing, and bactericidal treatment) of multiuse utensils or equipment is to be performed. In the pantry, a dishwashing machine may be substituted for the three-

compartment sink. In the kitchen, a dishwashing machine may be installed only if it is in addition to the sink.

The bactericidal treatment compartment of all sinks should have an effective depth 3 inches greater than the diameter of the largest dish or utensil to be treated. The compartment should also have at least 4 additional inches of free board depth, and an antisplash rim for the protection of employees. For plates 12 inches in diameter, for example, a bactericidal treatment compartment should have a liquid depth of 15 inches, while the minimum overall depth to the top of antisplash rim would be 19 inches.

When hot water is used as the bactericidal agent, the treatment compartment should be provided with a thermometer which is accurate to within 2° F., and on which the scale divisions are not more than 2° F. Provision should be made for maintaining the water in the treatment compartment at or above 170° F. Long-handled baskets are essential when the hot water method of bactericidal treatment is employed.

Long-handled baskets, while not required for chemical bactericidal treatment, are desirable in the interest of efficient operations.

Dishwashing machines, if used, should be so designed, installed, operated, and maintained that the utensils are rendered free of visible soil, wash water, and detergent, leaving them clean, reasonably dry, and free of micro-organisms which present a potential health hazard.

Scraping facilities should be provided for removing food particles from utensils. Prerinsing facilities are desirable; these, if provided, should maintain the wash water in a cleaner condition, thereby enhancing the effectiveness of the dishwashing machine.

The effectiveness of a spray-type dishwashing machine is contingent upon several factors. Some of these are inherent in its design and fabrication, while others depend upon the provision of satisfactory appurtenant equipment and proper operation and maintenance. Among the factors to be considered are the temperature and volume of the applied wash and rinse waters; the type and concentration of detergent used; the cleanliness and maintenance of the machine (which, in turn, are related to its durability and ease of cleaning); the duration of wash and rinse periods; the spray pattern; and the nozzle sizes and operating pressures.

In view of the above, the dishwashing machine should be designed and fabricated of durable materials which will withstand corrosion and be easily cleaned. The wash and rinse jet arms should be readily demountable or otherwise accessible for cleaning. Also, it should have inherent design features (such as duration of wash and rinse sprays, spray pattern, quantity, pressures, and control devices) which will assure a satisfactory dishwashing operation under proper installation, operation, and maintenance. This requires: (*a*) Provision for maintaining the wash water in the machine in the temperature range of 140° to 160° F. The detergent concentration should be maintained, preferably, by an automatic dispenser, or alternately,

by a definite system of manual feeding, such as spreading a predetermined quantity of detergent over each rack of utensils.

(*b*) Provision of an adequate water supply for the dishwashing operation, with a dependable pressure-regulating device (flow-control or pressure-reducing valves) if required, to maintain 15 to 30 pounds of flow pressure on the final-rinse line at the machine, and not less than 10 pounds per square inch at the rinse nozzles.

(*c*) Provision of adequate water-heating facilities, with dependable thermostatic control, to maintain a temperature of 180° F. or more in the final fresh-water-rinse line at the entrance of the rinse manifold on the machine. The minimum time of rinsing shall be 10 seconds.

(*d*) Provision of an easily readable thermometer for each tank and the final rinse-water line. Each thermometer should be accurate to within 2° F., and have scale divisions of not more than 2° F.

(*e*) Provision of sufficient racks and clean-utensil-storage area to permit air drying (usually about 45 seconds) before removal of utensils from racks following washing.

NOTE.—More detailed specifications for the various types of dishwashing machines may be found in Standard No. 3, Spray-Type Dishwashing Machines, adopted by the Joint Committee on Food Equipment Standards and published by the National Sanitation Foundation, Ann Arbor, Mich. (May 1953). Equipment manufactured in conformity with Standard No. 3 will be considered as complying with the sanitary design and construction standards of this manual.

After multiuse eating and drinking utensils have been thoroughly cleaned and rinsed, they should be subjected to one or more of the following procedures for proper bactericidal treatment:

(1) By immersion of the utensil or equipment for at least ½ minute in clean hot water at a temperature of at least 170° F.

(2) By immersion of the utensil or equipment for at least 1 minute in a lukewarm chlorine bath containing at least 50 p.p.m. of available chlorine if hypochlorites are used, or a concentration of equal bactericidal strength if chloramines are used.

Unless utensils and equipment are clean, bactericidal treatment with chlorine will be considered ineffective. The solution in the treatment compartment should contain about 100 p.p.m. chlorine initially, and should be discarded before the strength falls below 50 p.p.m. The strength of the chlorine solution may be determined with a test kit.

(3) By exposure of the utensil or equipment in a steam cabinet at a temperature of at least 170° F. for at least 15 minutes or at a temperature of 200° F. for at least 5 minutes.

(4) By exposure of the utensil or equipment in an oven or hot air cabinet at a temperature of at least 180° F. for at least 20 minutes.

(5) Equipment that is too large for immersion may be treated (*a*) with live steam from a hose, when the steam can be confined in the equipment;

(*b*) by a boiling water rinse; or (*c*) by spraying or swabbing with a solution of at least 100 p.p.m. chlorine.

(6) Any other method determined by the Surgeon General, upon application of an owner or operator of a conveyance, to be effective in the bactericidal treatment of utensils and equipment.

Wash water in sinks and dishwashing machines should be kept reasonably clean through frequent changes.

Utensils shall be air dried before being stored, or shall be stored in a self-draining position in such a manner that air drying will be accomplished within a reasonable time.

If a spray-type dishwashing machine is installed, it should be operated so that the utensils are made clean to the sight and touch. The machine should also subject such utensils to effective bactericidal treatment.

Proper use of the dishwashing machine would require, first, that utensils be thoroughly scraped, then placed in racks so that all surfaces of the utensils can be reached by wash water and rinse sprays and drain freely. For effective cleansing of utensils, wash water should contain a suitable detergent and should be maintained at a temperature of about 140° F. Acceptable cleaning results may be obtained with wash periods of at least 20 second to 1-minute durations. The bactericidal rinse should be maintained at or above a temperature of 180° F. (measured at the manifold). In a spray-type dishwashing machine, acceptable bactericidal treatment may be obtained with a rinse period of at least 10 seconds.

4. EQUIPMENT FOR STORING AND HANDLING UTENSILS AND NONPERISHABLE FOODS. *a.* Storage spaces for all containers, utensils, and nonperishable foods should be provided at a distance sufficiently above the floor to insure a clean, dry place and protection from splash, dust, overhead leakage, condensation, and other contamination.

b. Shelves should be of noncorrodible material and of easily cleanable construction. Removable rubber, corrugated metal, or other nonporous mats on shelf surfaces are acceptable. Shelves should be so constructed as to be removable or, if not removable, should have sealed joints or be bracketed in such a manner as to leave a cleanable space between the shelf edges and the walls of the storage space.

c. The interiors of cabinets and storage drawers (including silver drawers) should be of easily cleanable construction. Fixed felt or other porous linings are not acceptable.

d. Knife racks should be removable and easily cleanable.

e. Tray racks should be removable or open at the bottom for easy cleaning.

f. If bulk ice cream is to be served, a dipper well (with running water) or other acceptable facilities should be provided for storing the dispenser.

g. Sliding doors on cabinets, food warmers, etc., should be demountable for easy cleaning.

5. EQUIPMENT FOR DISPOSAL OF WASTES FROM FOOD AND DRINK. *a.* Refuse containers should be watertight, nonabsorbent, easily cleaned, and equipped with close-fitting covers.

b. Refuse chutes should be constructed so as to be easily cleaned and so as to prevent material from falling outside of the receiving container.

c. If garbage grinders are used without retention tanks or devices which prevent the use of grinders when cars are in stations or servicing areas, the grinder outlets should be constructed and located so that cans or containers may be placed beneath them.

d. In addition to the customary glass or dishwashing sink in the pantries and bars, it is suggested but not required that a small waste sink be provided into which may be emptied the contents from glasses returned from dining rooms and lounges.

6. REFRIGERATION. *a.* Refrigerators for the storage of foods should be capable of maintaining a temperature at or below 45° F. at all times.

b. An indicating thermometer should be provided to indicate the temperature in the warmest zone of each refrigerator, and should be placed where it can be read with ease. The thermometer should indicate the temperature in degrees Fahrenheit. The smallest scale division should be not more than 2° F., and the thermometer should be accurate within 2° F. plus or minus. Thermometers need not be installed on deep-freeze refrigerators.

c. Interior surfaces of refrigerators should be smooth, nonabsorbent, easily cleaned, and light colored.

d. When drains from ice refrigerators are designed to empty directly to the outside of the car, they should be provided with dust caps or traps containing a water seal for keeping the refrigerators free of road dust. Drains from mechanical or dry ice refrigerators are desirable to facilitate cleaning, but are not required. If provided, they should empty onto the floor of the kitchen, pantry, or bar.

7. STORAGE, PREPARATION, AND DISPLAY OF FOOD AND DRINK. *a.* Areas and equipment used for storing, preparing, and displaying food or drink should be constructed and located so as to provide protection from contamination for such food or drink.

b. Unless ice is manufactured on the car, a separate sink or compartment should be provided for storing and washing ice that will come in contact with food and drink. Cube ice may be stored in the original container in which received until it is used. Such sink or compartment should be provided with running water and a drain. To prevent contamination of the ice sink with possible backflow, the drain shall not be connected with the drains from other equipment and, if designed to empty directly to the outside of the car, shall be provided with dust caps or traps containing a water seal for keeping the sink free of road dust. The spigot used for filling pitchers, drinking glasses, and/or other containers should not be located

over or adjacent to the ice well unless effective shielding is provided to prevent contamination of the ice with spillage, drippings, splash, or spray. The opening at the top of the compartment should be at least equal in area to the largest horizontal cross-sectional area of the compartment. An ice scoop or tongs should be provided at the ice well. A hook, or an easily removable tapered receptacle open at the bottom and located outside the ice compartment, is suggested as a storage place for the ice scoop.

c. The dining car should be constructed and maintained so that rodents cannot enter it under normal conditions.

Section E. SANITARY FACILITIES AND CONTROLS

1. WATER SUPPLY. The water supply shall be adequate, of a safe, sanitary quality and shall be obtained only from a watering point approved by the Public Health Service.

Hot and cold running water under pressure shall be provided in all areas where food is prepared, or equipment, utensils, or containers are washed.

Tanks should be drained and flushed with potable water at least once each month. Records showing the date and location of flushing should be kept on the car and be readily available for inspection.

Ice shall be made from water which comes from an approved source, and shall be used only if it has been manufactured, stored, transported, and handled in a sanitary manner.

2. PLUMBING. Plumbing shall be so sized, installed, and maintained as to carry adequate quantities of water to required locations throughout the dining car; as to prevent contamination of the water supply; as to properly convey liquid wastes; and so that it does not constitute a source of contamination of food, equipment, or utensils, or create an insanitary condition or nuisance.

Hot water (minimum 100° F.) and cold water shall be piped to all areas in which food or drink is prepared or utensils washed. Water storage facilities should be large enough to provide a quantity of water adequate for proper cleaning of equipment and utensils.

To prevent back-siphonage of contaminated water, all water inlets to sinks, washbasins, steamtables, etc., should terminate at least 1 inch, or twice the diameter of the inlet, whichever is greater, above the overflow rim of the fixture; or a backflow preventer (vacuum breaker) should be installed on the discharge side of the water control valve, with the bottom of the backflow preventer at least 6 inches above the overflow rim of the fixture. However, if the water system is gravity type, and the air inlet to the vent is located higher than every water discharge outlet of the system, the vacuum breaker may be omitted.

3. TOILET FACILITIES. Toilet facilities for the exclusive use of food or drink handling crews are not required. However, clean toilet facilities

available to these crews are to be provided and should be convenient to the food or drink service area on the train. In the case of a dining car not in a train, but with a crew on board, adequate toilet facilities shall be available to the crew within a reasonable distance.

4. HANDWASHING FACILITIES. *a.* Handwashing facilities for the exclusive use of dining car employees should be provided in the food preparation areas of each car on which food or drink is prepared or served. The facilities should be located where they are readily available to food service personnel at all times.

Where a permanent or semipermanent partition is provided between the kitchen and pantry of a dining car, lavatories should be provided in both areas. The use of a folddown serving board between the kitchen and the pantry will not be interpreted as constituting a permanent or semipermanent partition, provided there is no storage of cans, bags, boxes, etc., beneath the board to impede passage.

b. Handwashing facilities for the exclusive use of bar employees are not required in the bar section of cars, if handwashing facilities are accessible to these employees elsewhere on the car. Handwashing facilities should include a lavatory or lavatories equipped with hot and cold or tempered running water, hand-cleansing soap or detergent, and approved sanitary towels or other approved hand-drying devices. Such facilities shall be kept clean and in good repair.

5. VERMIN CONTROL. Effective measures shall be taken to protect against the entrance into the dining car and the breeding or presence of vermin on the car.

6. GARBAGE AND RUBBISH DISPOSAL. All garbage and rubbish containing food wastes shall, prior to disposal, be kept in leakproof, nonabsorbent containers which shall be kept covered with tight-fitting lids when filled or stored, or not in continuous use.

To prevent creation of a nuisance or unsightly conditions, all garbage, trash, and other waste material should be removed from the car as often as necessary. All garbage containers should be thoroughly washed before being returned for reuse, except in those cases where the containers are emptied enroute at stops where can washing facilities are not available.

Section F. OTHER FACILITIES AND OPERATIONS

1. FLOORS. *a.* The floor surfaces in kitchens, in all other rooms and areas in which food is stored or prepared and in which utensils are washed shall be of smooth, nonabsorbent materials, and so constructed as to be easily cleanable. All floors shall be kept clean and in good repair. Floor drains shall be provided in all rooms where floors are subjected to flooding-type cleaning or where normal operations release or discharge water or other liquid waste on the floor. Such floors shall be graded to drain. Drains to

the outside of the car should be constructed and maintained so as to prevent the infiltration of dust into the car.

b. The floors, except for those areas in which food or drink is prepared, or stored or utensils are washed, may be covered with carpeting.

c. Openings to spaces that cannot be cleaned easily should be sealed. Floor racks, if used, should be so constructed as to be easily removable from the car and should be cleaned daily or upon completion of each trip.

Dustless methods of floor cleaning should be employed, and all except emergency floor cleaning should be done during those periods when food and drink are not exposed. It is important that removable drain caps be replaced after cleaning.

2. WALLS AND CEILINGS. *a.* Walls and ceilings in areas where food or drink is stored or prepared should be smooth, light in color, and washable. Joints should be tight, or seams should be filled and finished to a smooth surface, to facilitate cleaning and to prevent infestation by or harborage for insects.

The walls, ceilings, and exposed surfaces of pipes, tanks, windows, ventilating equipment, etc., of dining cars should be kept clean and in good repair.

b. Spaces between pieces of equipment, or between a piece of equipment and a wall, should be enclosed unless they can be easily cleaned.

c. All exposed joints between equipment and the floor, equipment and the walls, or the walls and the floor, should be rounded with not less than ¼-inch radius.

3. DOORS AND WINDOWS. Windows and doors of cars in which food or drink is stored, prepared, or served should be constructed so as to be reasonably dust-tight. Windows should be sealed or so constructed as to permit the installation of screens with not less than 16-mesh wire. When the car is in motion, outside doors and windows should be kept closed to reduce dust infiltration to a minimum.

4. LIGHTING. All areas in which food is prepared or stored or utensils are washed, hand-washing areas, dressing or locker rooms, toilet rooms, and garbage and rubbish storage areas shall be well lighted. During all clean-up activities, adequate light shall be provided in the area being cleaned, and upon or around equipment being cleaned.

At least 20 foot-candles of light shall be required on all working surfaces and at least 10 foot-candles on all other surfaces and equipment, in food preparation, utensil-washing and hand-washing areas.

In areas where food or drink is served, the intensity of artificial light sources may be determined by the individual carrier.

5. VENTILATION. *a.* All areas where food or drink is prepared or served, or in which utensils are washed, should be kept reasonably free of disagreeable odors, condensation, and excessive heat, through proper ventilation.

The practice of opening doors or windows on moving trains to achieve ventilation is considered unsatisfactory.

b. The following suggestions are offered for consideration in planning the ventilation and heat control of areas where food and drinks are prepared:

(1) An abundant supply of filtered air may be necessary for ventilating the kitchen and pantry areas effectively. If outside air is added, a heating device, preferably thermostatically controlled, should be provided for warming the air during the winter months.

(2) Since the range is the major source of heat in the kitchen, an air exhaust should be located above or behind the range. Ventilation hoods and devices shall be designed to prevent grease or condensate from dripping into food or onto food preparation surfaces. Filters, where used, shall be readily removable for cleaning or replacement.

6. MISCELLANEOUS. *a.* Separate storage spaces equipped with a door or doors should be provided for storage of clean linen and soiled linen.

b. Provision of space for storage of bedding or other materials unrelated to food preparation areas of dining cars is not acceptable.

c. Clothing lockers, if provided, should not open into the kitchen or pantry area.

d. Spaces where food is stored, prepared, or served should not be used for sleeping quarters. Pantries, kitchens, and bar areas should not be used for dressing rooms.

e. Personal articles of employees should not be stored in the kitchen or pantry.

f. All parts of the dining car shall be kept neat, clean, and free of litter and rubbish. Cleaning operations shall be conducted in such a manner as to minimize contamination of food and food-contact surfaces.

g. Soiled linen, coats, and aprons should be kept in containers provided for that purpose.

U.S. GOVERNMENT PRINTING OFFICE: 1954 O—720-738

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Public Health Service

Regional Offices

REGION I—Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
120 Boylston Street
Boston, Mass. 02116

REGION II—Delaware, New Jersey, New York, Pennsylvania
Room 1200, 42 Broadway
New York, N.Y. 10004

REGION III—District of Columbia, Kentucky, Maryland, North Carolina, Virginia, West Virginia, Puerto Rico, Virgin Islands
700 East Jefferson Street
Charlottesville, Va. 22901

REGION IV—Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee
Room 404, 50 Seventh Street, NE.
Atlanta, Ga. 30323

REGION V—Illinois, Indiana, Michigan, Ohio, Wisconsin
Room 712, New Post Office Building
433 West Van Buren Street
Chicago, Ill. 60607

REGION VI—Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota
560 Westport Road
Kansas City, Mo. 64111

REGION VII—Arkansas Louisiana, New Mexico, Oklahoma, Texas
Ninth Floor, 1114 Commerce Street
Dallas, Tex. 75222

REGION VIII—Colorado, Idaho, Montana, Utah, Wyoming
Equitable Building
730–17th Street
Denver, Colo. 80202

REGION IX—Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington, Guam, American Samoa
447 Federal Office Building
Civic Center
San Francisco, Calif. 94102